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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/600,927	06/19/2003	Chien-Chung Han	HAN0302	6209

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EXAMINER

BRUENJES, CHRISTOPHER P

ART UNIT	PAPER NUMBER
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1772

DATE MAILED: 02/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/600,927

Applicant(s)

HAN, CHIEN-CHUNG

Examiner

Christopher P Bruenjes

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 December 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-23 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group I, claims 1-23 in the reply filed on December 14, 2004 is acknowledged.

2. Claims 24-38 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on December 14, 2004.

Priority

3. If applicant desires benefit of a previously filed application under 35 U.S.C. 120, specific reference to the earlier filed application must be made in the instant application. For benefit claims under 35 U.S.C. 120, 121 or 365(c), the reference must include the relationship (i.e., continuation, divisional, or continuation-in-part) of the applications. This should appear as the first sentence(s) of the specification following the title, preferably as a separate paragraph unless it appears in an application data sheet. The status of nonprovisional parent application(s) (whether patented

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or abandoned) should also be included. If a parent application has become a patent, the expression "now Patent No. ____" should follow the filing date of the parent application. If a parent application has become abandoned, the expression "now abandoned" should follow the filing date of the parent application.

If the application is a utility or plant application filed under 35 U.S.C. 111(a) on or after November 29, 2000, the specific reference must be submitted during the pendency of the application and within the later of four months from the actual filing date of the application or sixteen months from the filing date of the prior application. If the application is a utility or plant application which entered the national stage from an international application filed on or after November 29, 2000, after compliance with 35 U.S.C. 371, the specific reference must be submitted during the pendency of the application and within the later of four months from the date on which the national stage commenced under 35 U.S.C. 371(b) or (f) or sixteen months from the filing date of the prior application. See 37 CFR 1.78(a)(2)(ii) and (a)(5)(ii). This time period is not extendable and a failure to submit the reference required by 35 U.S.C. 119(e) and/or 120, where applicable, within this time period is considered a waiver of any benefit of such prior

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application(s) under 35 U.S.C. 119(e), 120, 121 and 365(c). A benefit claim filed after the required time period may be accepted if it is accompanied by a grantable petition to accept an unintentionally delayed benefit claim under 35 U.S.C. 119(e), 120, 121 and 365(c). The petition must be accompanied by (1) the reference required by 35 U.S.C. 120 or 119(e) and 37 CFR 1.78(a)(2) or (a)(5) to the prior application (unless previously submitted), (2) a surcharge under 37 CFR 1.17(t), and (3) a statement that the entire delay between the date the claim was due under 37 CFR 1.78(a)(2) or (a)(5) and the date the claim was filed was unintentional. The Director may require additional information where there is a question whether the delay was unintentional. The petition should be addressed to: Mail Stop Petition, Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450.

In this particular case application number 09/401,048 is a divisional of application number 09/985,338. The instant application has claimed continuation-in-part benefit of the non-provisional application 09/985,338, but without specifically claiming benefit in the instant application to the parent case to 09/985,338, the instant invention does not receive any benefit to the prior application 09/401,048.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

4. Claims 1-2 and 15-17 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-12 of U.S. Patent No. 6,602,567.

Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of '567 teach a carbon tube and device comprising carbonized coating material and carbonized fiber residue made by the process including the steps of: coating a fiber with a carbonizable carbon-containing material to form a coating layer on the fiber, removing said fiber and carbonizing said coating layer and the residue of said fibers to form said carbonized

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carbon tube. The fiber is a monofilament or yarn, and the removing step and carbonizing step are performed concurrently.

The claims of '567 fail to explicitly teach forming a plurality of the carbon tubes and forming them into an assembled structure by using a binding element. However, in light of the specification of '567 it is suggested to one of ordinary skill in the art that the carbon tubes formed in the claimed invention are used in assembled structures in order to form devices (col.4, 1.57 - col.5, 1.10). One of ordinary skill in the art would have also recognized that the binding element used to hold the fibers together prior to carbonization in order to form the assembled structure would be carbonized when the tubes were carbonized.

Therefore, it would have been obvious to one having ordinary skill in the art at the time Applicant's invention was made to form the individual carbon tubes taught in the claims of '567 into assembled structures utilizing a binding agent, because assembled structures are particularly useful in practical applications of carbon tubes, as suggested in the claims in light of the specification of '567.

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5. Claims 1-2 and 15-17 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-25 of U.S. Patent No. 6,506,323.

Although the conflicting claims are not identical, they are not patentably distinct from each other because the claims of '323 teach a method of forming a carbon tube including the steps of: coating a fiber with a carbonizable carbon-containing material to form a coating layer on the fiber, removing said fiber and carbonizing said coating layer and the residue of said fibers to form said carbonized carbon tube, which inherently produces a carbon tube comprising carbonized coating material and carbonized fiber residue. The fiber is a monofilament or yarn, and the removing step and carbonizing step are performed concurrently.

The claims of '323 fail to explicitly teach forming a plurality of the carbon tubes and forming them into an assembled structure by using a binding element. However, in light of the specification of '323 it is suggested to one of ordinary skill in the art that the carbon tubes formed in the claimed invention are used in assembled structures in order to form devices (col.5, 1.1-21). One of ordinary skill in the art would have also recognized that the binding element used to hold the fibers

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together prior to carbonization in order to form the assembled structure would be carbonized when the tubes were carbonized.

Therefore, it would have been obvious to one having ordinary skill in the art at the time Applicant's invention was made to form the individual carbon tubes taught in the claims of '323 into assembled structures utilizing a binding agent, because assembled structures are particularly useful in practical applications of carbon tubes, as suggested in the claims in light of the specification of '323.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1-3, 5-6, 9, 14-19, and 22 are rejected under 35 U.S.C. 102(e) as being anticipated by Haggard et al (US 2005/0032450 A1).

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Note that although the instant application is a continuation-in-part of application number 09/985,338, claims 1-23 only receive the benefit of the actual filing date of the instant application, which is June 19, 2003, because the binding agent present in all of the claims was not taught in the previous application and therefore the claims do not have the benefit of the earlier date.

Haggard et al anticipate a device of an assembled structure comprising a plurality of carbonized carbon tubes wherein said plurality of carbonized carbon tubes include carbonized coating material (reference number 14, Figure 1C), carbonized fiber residue (reference number 16, Figure 1C), and a binding agent (reference number 12, Figure 1C), which at least part of the binding agent is carbonized, which specifically anticipates claims 16 and 17. The fiber core of the tubes and the binding agent are formed of dissolvable polymer components (p.4, paragraph 35). Dissolvable polymer components as defined by Haggard et al include fully or partially soluble or partially dispersible polymers within a solvent or dissolving medium (p.3, paragraph 23). Therefore, when the fiber core and binding agent are dissolved prior to or during carbonization, at least part of the fiber and binding agent are carbonized with the coating or sheath material. Regarding claims 18-19, because the binding

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element is a polymer used to hold the tubes together the binding element is and provides interfacial covalent bonds at the contacted surfaces between said carbon tubes. Regarding claim 22, the assembled structure is a rod or cylinder with the averaged axis of said carbon tubes being aligned along with the axis of said assembled structure (Figure 1C). Regarding claims 1-3, 9, and 15, the device of Haggard et al has the same final structure as the claimed device of claims 1-3, 9, and 15 because each monofilament fibers (reference number 16, Figure 1C) is covered with a sheath or coating material containing carbon (reference number 14, Figure 1C) and the plurality of coated fibers is formed into an assembled matrix containing a polymer binding agent (reference number 12, Figure 1C). Before or during carbonization the plurality of fibers is removed and the residue of fibers and coating or sheath layer along with at least he residue of the binding agent are carbonized to form an assembled structure containing a plurality of carbonized carbon tubes (p.4, paragraphs 35 and 36). Regarding claim 5, the chemical material forming the binding agent is thermally less stable than the coating material because the heating during carbonization drives off or removes the binding element (p.4, paragraph 37). Regarding claim 6, the binding agent is a polymeric matrix, which holds the fibers and sheaths in place

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within the assembled structure, so therefore inherently is able to chemically or physically interact with the surfaces of said coating layers and result in interfacial bonding structures among said carbon tubes. Regarding claim 14, the method used to assemble the carbon tubes receives little patentable weight because the final product is the same, in that both the claimed invention and Haggard et al are both assembled carbon tube structures regardless of how they were assembled.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.

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3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

7. Claims 4, 7, 10-13, 20, 21, and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Haggard et al (US 2005/0032450 A1) in view of Tour et al (US 2004/0222081 A1).

Haggard et al teach all that is claimed in claims 1, 3, and 16, as shown above, but fail to teach specific binding interactions between the binding agent and carbon tubes.

However, Tour et al teach ways of forming assembled structures of pre-formed carbon tubes such as the carbon tubes formed in Haggard et al (p.2, paragraph 21). Tour et al teach that to form assembled structures such as plates or meshes the carbon tubes are fused together (p.1, paragraph 8). During the binding process the binding agent the carbon tubes sticking to or interpenetrating into each other at the contacted surfaces (p.1, paragraph 8). The binding step specifically taught in Tour et al includes crosslinking the carbon tubes through microwave radiation (p.3, paragraphs 28-30). The binding step includes multiple types of binding agents in combination with the microwave radiations, such as the radiation environment for the binding step includes reactive gas such as hot air (p.4, paragraph 38). The host materials used includes metals and

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other inorganic network structures (p.4, paragraph 41). The final structure after the microwave radiation is used to bind the carbon tubes includes the carbon walls interpenetrating into other carbon tubes, therefore, the carbon tubes of Haggard et al assembled using the microwave radiation would include carbonized coating material in the binding element. One of ordinary skill in the art would have recognized that in order to bind a plurality of pre-formed carbon tubes together in order to form an assembled device microwave radiation in combination with other binding elements shown above is used in order to crosslink and/or fuse the carbon tubes together so that the assembled structure can be used for further development into a functioning device, as taught by Tour et al.

Therefore, it would have been obvious to one having ordinary skill in the art at the time Applicant's invention was made to crosslink and/or weld a plurality of pre-formed carbon tubes, such as the carbon tubes of Haggard et al, by microwave radiation in combination with other binding elements in order to form strongly bonded assembled structures that can be used for further development into useful devices, as taught by Tour et al.

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8. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Haggard et al (US 2005/0032450 A1) in view of Moy et al (USPN 6,841,508).

Haggard et al teach all that is claimed in claim 1 above, but fail to explicitly teach utilizing a crosslinking reagent as the binding agent. However, Moy et al teach that carbon tubes are bonded together to form aggregates of carbon tubes by adding a gluing agent or binder in order to render the carbon tubes capable of extrusion by conventional extrusion methods (col.11, 1.65 - col.12, 1.5). The binding agents used to form aggregates that are capable of extrusion include a polymer and hydrogen peroxide (col.12, 1.18-28). One of ordinary skill in the art at the time Applicant's invention was made would have recognized that polymers in combination with hydrogen peroxide, which is a known crosslinking reagent, are used as binding agents to bond carbon tubes into an aggregate in order to render the carbon tubes capable of extrusion, which leads to simpler manufacture of devices containing the carbon tubes, as taught by Moy et al.

Therefore, it would have been obvious to one having ordinary skill in the art at the time Applicant's invention was made to use a polymer and hydrogen peroxide, which is a crosslinking agent, as the binding agent for forming an aggregate of carbon tubes of Haggard et al, in order to render

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the carbon tubes of Haggard et al capable of extrusion, which leads to simpler manufacture of devices containing the carbon tubes, as taught by Moy et al.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Heine et al (USPN 6,231,791).


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher P Bruenjes whose telephone number is 571-272-1489. The examiner can normally be reached on Monday thru Friday from 8:00am-4:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Pyon can be reached on 571-272-1498. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Christopher P Bruenjes
Examiner
Art Unit 1772
CPB
CPB
February 15, 2005


PAID BY
SUPERVISOR'S NAME
1772 2/16/05